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DRAWINGS - TWENTY-NINE (29) SHEETS

Applicant(s):	Koichiro Yamaguchi et al.
Title:	DIGITAL BROADCAST RECEIVING DEVICE
Attorney's Docket No.:	NAK1-BN62

"EXPRESS MAIL" MAILING LABEL NO. EM563488495US

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FIG. 1

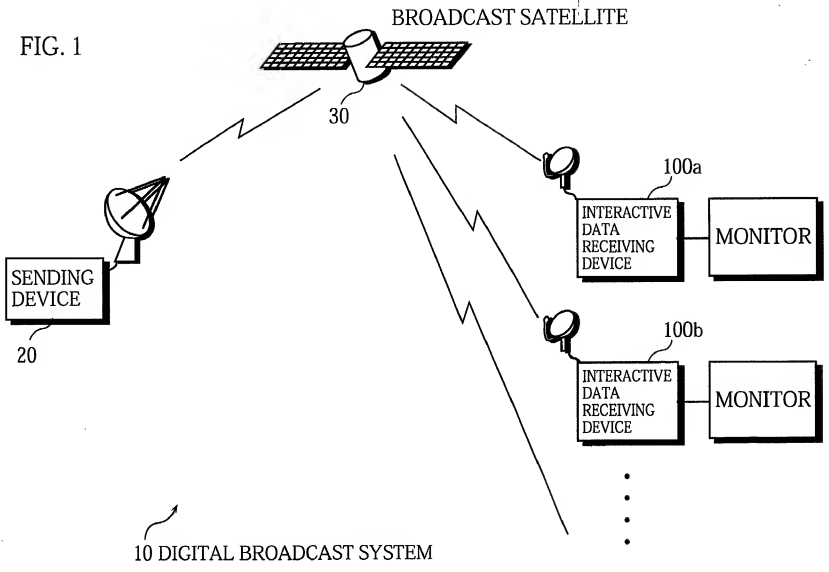

BROADCAST SATELLITE
30
SENDING DEVICE
20
100a
INTERACTIVE DATA RECEIVING DEVICE
MONITOR
100b
INTERACTIVE DATA RECEIVING DEVICE
MONITOR
10 DIGITAL BROADCAST SYSTEM

FIG. 2

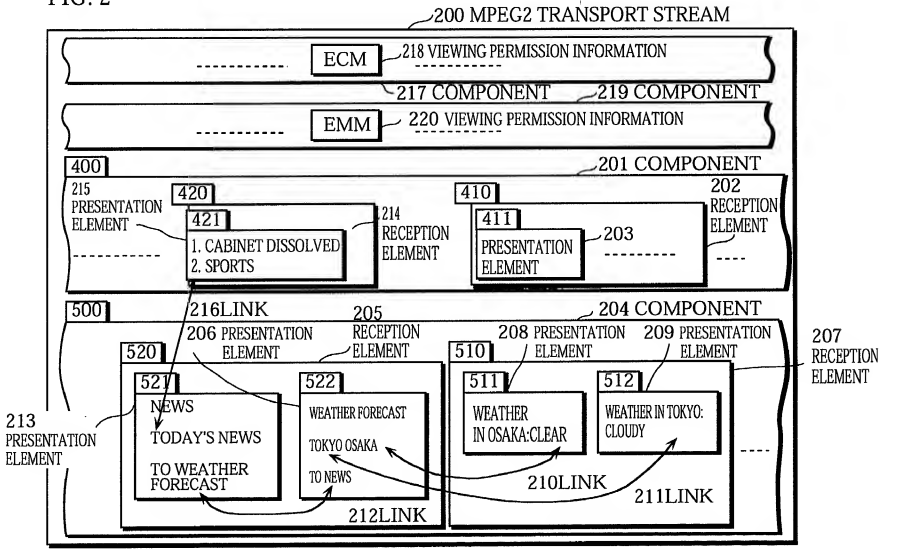

200 MPEG2 TRANSPORT STREAM
ECM
218 VIEWING PERMISSION INFORMATION
217 COMPONENT
219 COMPONENT
EMM
220 VIEWING PERMISSION INFORMATION
400
201 COMPONENT
215 PRESENTATION ELEMENT
420
421
1. CABINET DISSOLVED
2. SPORTS
214 RECEPTION ELEMENT
410
411
PRESENTATION ELEMENT
203
202 RECEPTION ELEMENT
500
216LINK
205 RECEPTION ELEMENT
204 COMPONENT
206 PRESENTATION ELEMENT
208 PRESENTATION ELEMENT
209 PRESENTATION ELEMENT
207 RECEPTION ELEMENT
520
521
NEWS
TODAY'S NEWS
TO WEATHER FORECAST
522
WEATHER FORECAST
TOKYO OSAKA
TO NEWS
510
511
WEATHER IN OSAKA:CLEAR
512
WEATHER IN TOKYO: CLOUDY
213 PRESENTATION ELEMENT
210LINK
211LINK
212LINK

FIG. 3

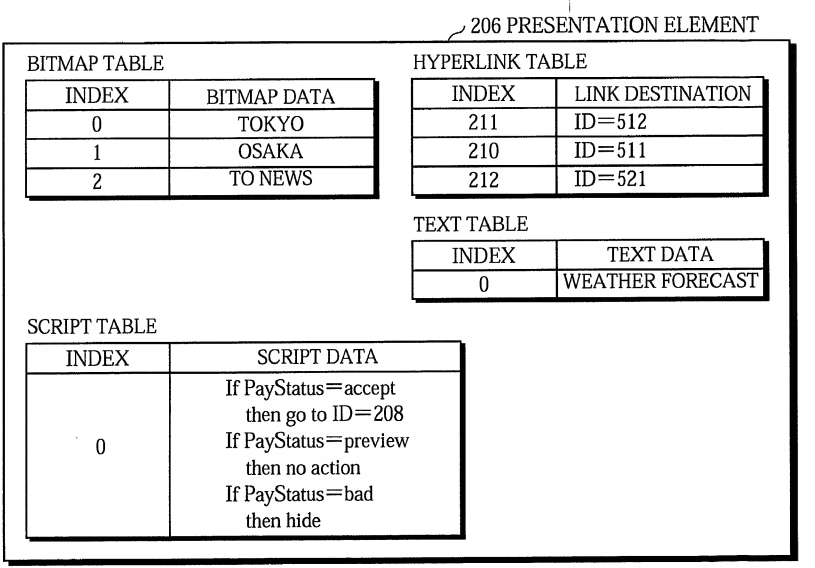

206 PRESENTATION ELEMENT
BITMAP TABLE
INDEX
BITMAP DATA
0
TOKYO
1
OSAKA
2
TO NEWS
HYPERLINK TABLE
INDEX
LINK DESTINATION
211
ID=512
210
ID=511
212
ID=521
TEXT TABLE
INDEX
TEXT DATA
0
WEATHER FORECAST
SCRIPT TABLE
INDEX
SCRIPT DATA
0
If PayStatus=accept
then go to ID=208
If PayStatus=preview
then no action
If PayStatus=bad
then hide

FIG. 4

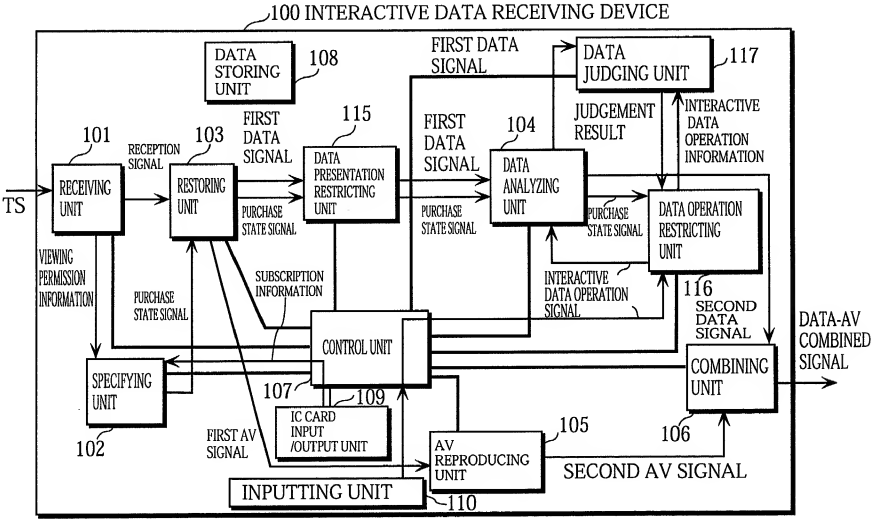

100 INTERACTIVE DATA RECEIVING DEVICE
DATA STORING UNIT
108
FIRST DATA SIGNAL
DATA JUDGING UNIT
117
INTERACTIVE DATA OPERATION INFORMATION
JUDGEMENT RESULT
101
RECEPTION SIGNAL
103
FIRST DATA SIGNAL
115
FIRST DATA SIGNAL
104
TS
RECEIVING UNIT
RESTORING UNIT
DATA PRESENTATION RESTRICTING UNIT
DATA ANALYZING UNIT
DATA OPERATION RESTRICTING UNIT
PURCHASE STATE SIGNAL
PURCHASE STATE SIGNAL
PURCHASE STATE SIGNAL
VIEWING PERMISSION INFORMATION
PURCHASE STATE SIGNAL
SUBSCRIPTION INFORMATION
INTERACTIVE DATA OPERATION SIGNAL
116
SECOND DATA SIGNAL
DATA-AV COMBINED SIGNAL
CONTROL UNIT
SPECIFYING UNIT
COMBINING UNIT
107
109
IC CARD INPUT /OUTPUT UNIT
105
106
102
FIRST AV SIGNAL
AV REPRODUCING UNIT
SECOND AV SIGNAL
INPUTTING UNIT
110

FIG. 5

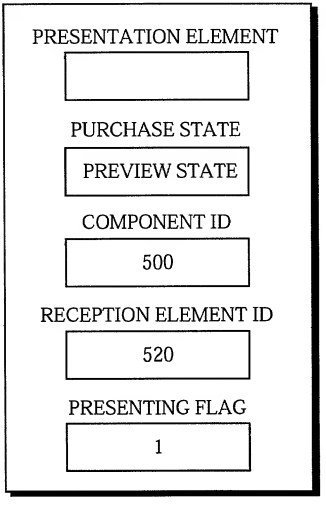

PRESENTATION ELEMENT
PURCHASE STATE
PREVIEW STATE
COMPONENT ID
500
RECEPTION ELEMENT ID
520
PRESENTING FLAG
1

FIG. 6

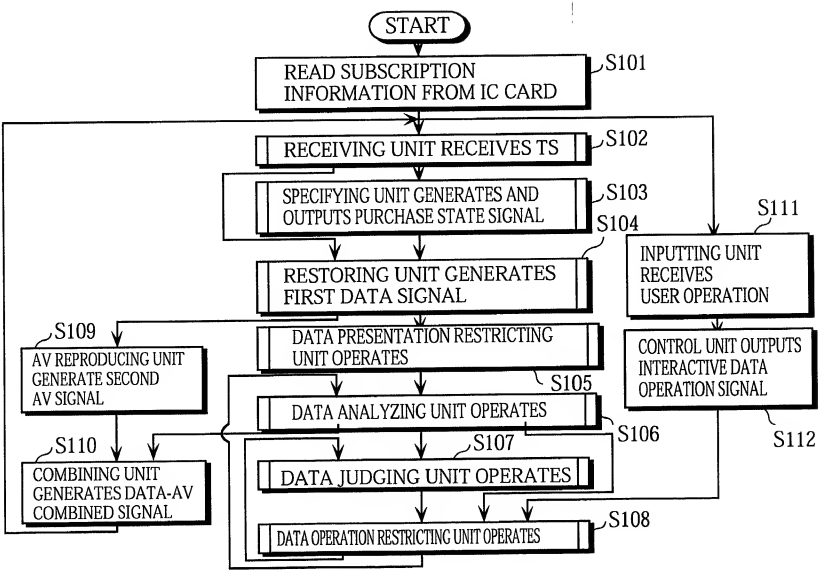

START
READ SUBSCRIPTION INFORMATION FROM IC CARD
S101
RECEIVING UNIT RECEIVES TS
S102
SPECIFYING UNIT GENERATES AND OUTPUTS PURCHASE STATE SIGNAL
S103
S104
RESTORING UNIT GENERATES FIRST DATA SIGNAL
S111
INPUTTING UNIT RECEIVES USER OPERATION
S109
AV REPRODUCING UNIT GENERATE SECOND AV SIGNAL
DATA PRESENTATION RESTRICTING UNIT OPERATES
CONTROL UNIT OUTPUTS INTERACTIVE DATA OPERATION SIGNAL
S105
DATA ANALYZING UNIT OPERATES
S106
S112
S110
COMBINING UNIT GENERATES DATA-AV COMBINED SIGNAL
S107
DATA JUDGING UNIT OPERATES
S108
DATA OPERATION RESTRICTING UNIT OPERATES

FIG. 7

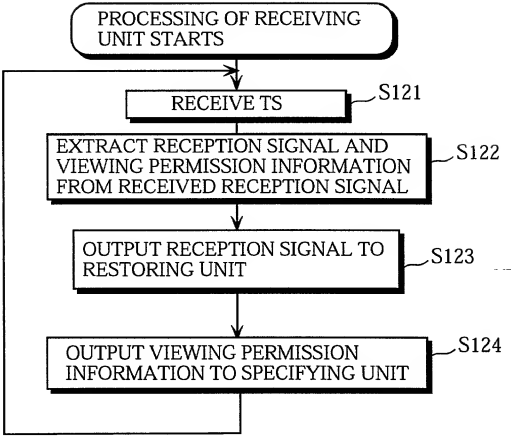

PROCESSING OF RECEIVING UNIT STARTS
RECEIVE TS
S121
EXTRACT RECEPTION SIGNAL AND VIEWING PERMISSION INFORMATION FROM RECEIVED RECEPTION SIGNAL
S122
OUTPUT RECEPTION SIGNAL TO RESTORING UNIT
S123
OUTPUT VIEWING PERMISSION INFORMATION TO SPECIFYING UNIT
S124

FIG. 8

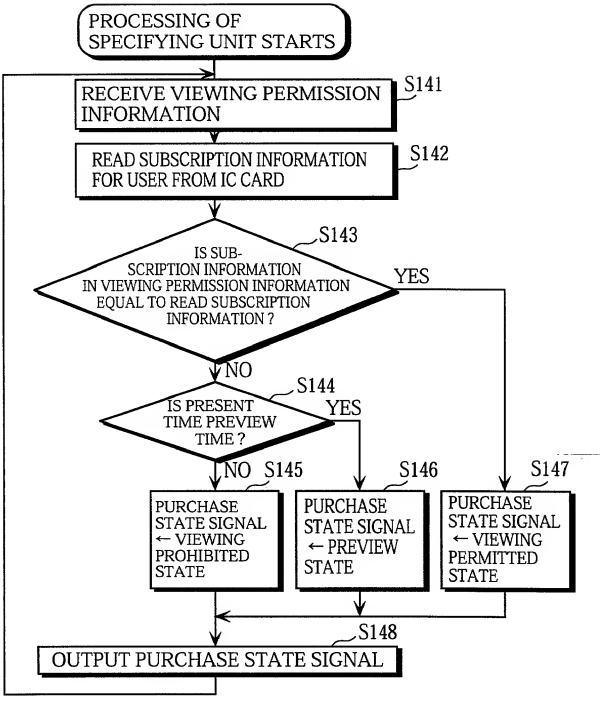

PROCESSING OF SPECIFYING UNIT STARTS
RECEIVE VIEWING PERMISSION INFORMATION
S141
READ SUBSCRIPTION INFORMATION FOR USER FROM IC CARD
S142
IS SUB-SCRIPTION INFORMATION IN VIEWING PERMISSION INFORMATION EQUAL TO READ SUBSCRIPTION INFORMATION ?
S143
YES
NO
IS PRESENT TIME PREVIEW TIME ?
S144
YES
NO
S145
S146
S147
PURCHASE STATE SIGNAL ← VIEWING PROHIBITED STATE
PURCHASE STATE SIGNAL ← PREVIEW STATE
PURCHASE STATE SIGNAL ← VIEWING PERMITTED STATE
S148
OUTPUT PURCHASE STATE SIGNAL

FIG. 9

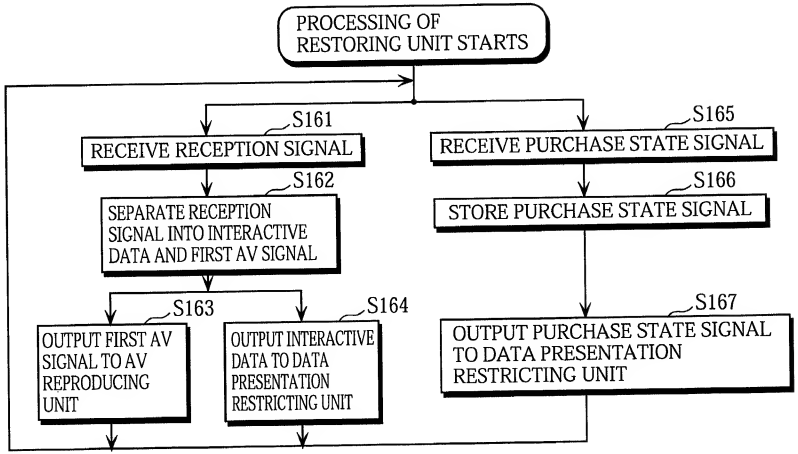

PROCESSING OF RESTORING UNIT STARTS
S161
RECEIVE RECEPTION SIGNAL
S162
SEPARATE RECEPTION SIGNAL INTO INTERACTIVE DATA AND FIRST AV SIGNAL
S163
OUTPUT FIRST AV SIGNAL TO AV REPRODUCING UNIT
S164
OUTPUT INTERACTIVE DATA TO DATA PRESENTATION RESTRICTING UNIT
S165
RECEIVE PURCHASE STATE SIGNAL
S166
STORE PURCHASE STATE SIGNAL
S167
OUTPUT PURCHASE STATE SIGNAL TO DATA PRESENTATION RESTRICTING UNIT

FIG. 10

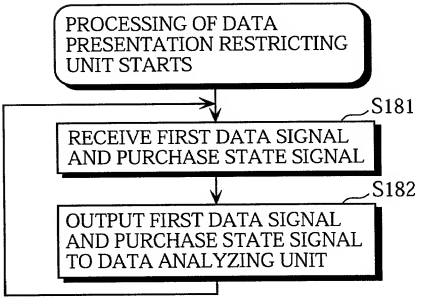

PROCESSING OF DATA PRESENTATION RESTRICTING UNIT STARTS
S181
RECEIVE FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL
S182
OUTPUT FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL TO DATA ANALYZING UNIT

FIG. 11

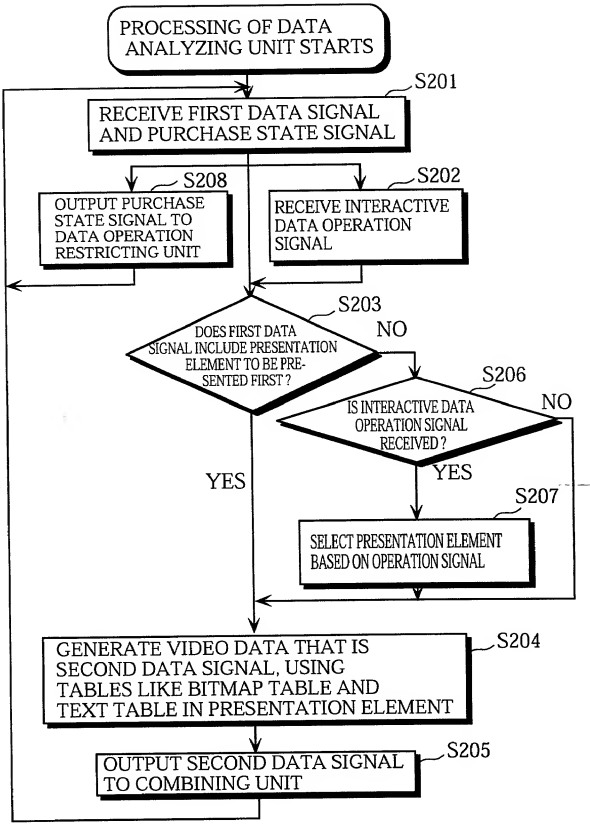

PROCESSING OF DATA ANALYZING UNIT STARTS
S201
RECEIVE FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL
S208
OUTPUT PURCHASE STATE SIGNAL TO DATA OPERATION RESTRICTING UNIT
S202
RECEIVE INTERACTIVE DATA OPERATION SIGNAL
S203
DOES FIRST DATA SIGNAL INCLUDE PRESENTATION ELEMENT TO BE PRESENTED FIRST?
NO
YES
S206
IS INTERACTIVE DATA OPERATION SIGNAL RECEIVED?
NO
YES
S207
SELECT PRESENTATION ELEMENT BASED ON OPERATION SIGNAL
S204
GENERATE VIDEO DATA THAT IS SECOND DATA SIGNAL, USING TABLES LIKE BITMAP TABLE AND TEXT TABLE IN PRESENTATION ELEMENT
S205
OUTPUT SECOND DATA SIGNAL TO COMBINING UNIT

FIG. 12

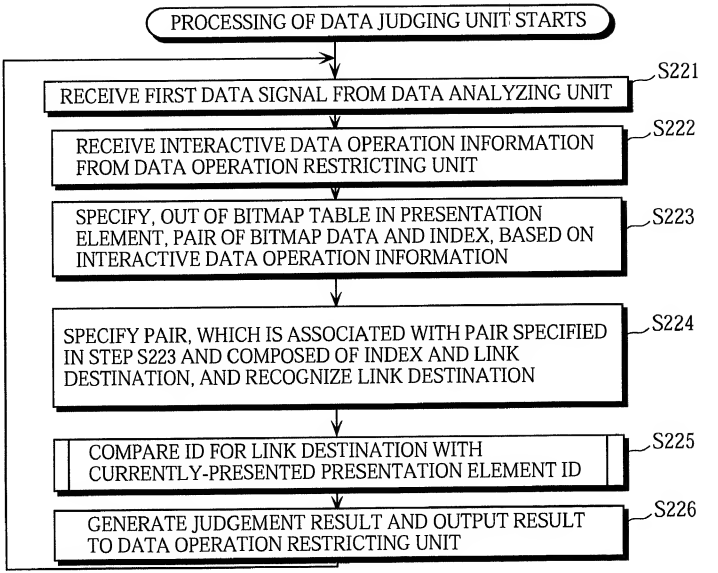

PROCESSING OF DATA JUDGING UNIT STARTS
RECEIVE FIRST DATA SIGNAL FROM DATA ANALYZING UNIT
S221
RECEIVE INTERACTIVE DATA OPERATION INFORMATION FROM DATA OPERATION RESTRICTING UNIT
S222
SPECIFY, OUT OF BITMAP TABLE IN PRESENTATION ELEMENT, PAIR OF BITMAP DATA AND INDEX, BASED ON INTERACTIVE DATA OPERATION INFORMATION
S223
SPECIFY PAIR, WHICH IS ASSOCIATED WITH PAIR SPECIFIED IN STEP S223 AND COMPOSED OF INDEX AND LINK DESTINATION, AND RECOGNIZE LINK DESTINATION
S224
COMPARE ID FOR LINK DESTINATION WITH CURRENTLY-PRESENTED PRESENTATION ELEMENT ID
S225
GENERATE JUDGEMENT RESULT AND OUTPUT RESULT TO DATA OPERATION RESTRICTING UNIT
S226

FIG. 13

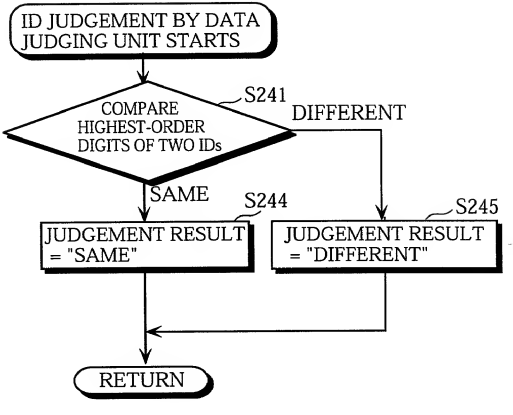

ID JUDGEMENT BY DATA JUDGING UNIT STARTS
COMPARE HIGHEST-ORDER DIGITS OF TWO IDs
S241
DIFFERENT
SAME
S244
JUDGEMENT RESULT = "SAME"
S245
JUDGEMENT RESULT = "DIFFERENT"
RETURN

FIG. 14

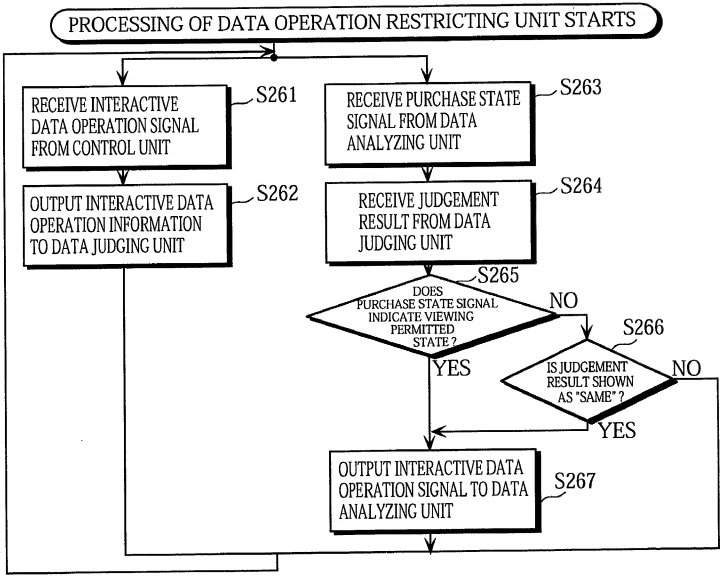

PROCESSING OF DATA OPERATION RESTRICTING UNIT STARTS
RECEIVE INTERACTIVE DATA OPERATION SIGNAL FROM CONTROL UNIT
S261
OUTPUT INTERACTIVE DATA OPERATION INFORMATION TO DATA JUDGING UNIT
S262
RECEIVE PURCHASE STATE SIGNAL FROM DATA ANALYZING UNIT
S263
RECEIVE JUDGEMENT RESULT FROM DATA JUDGING UNIT
S264
S265
DOES PURCHASE STATE SIGNAL INDICATE VIEWING PERMITTED STATE ?
NO
YES
S266
IS JUDGEMENT RESULT SHOWN AS "SAME" ?
NO
YES
OUTPUT INTERACTIVE DATA OPERATION SIGNAL TO DATA ANALYZING UNIT
S267

FIG. 15

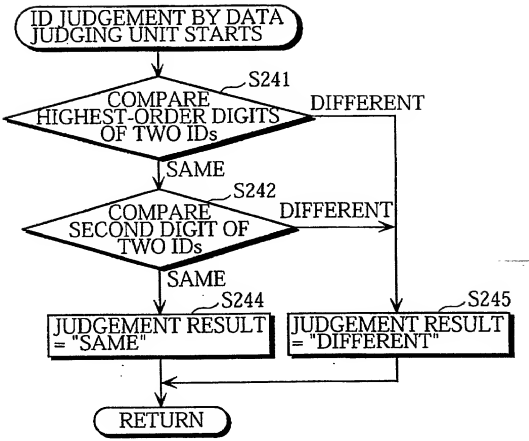

ID JUDGEMENT BY DATA JUDGING UNIT STARTS
S241
COMPARE HIGHEST-ORDER DIGITS OF TWO IDs
DIFFERENT
SAME
S242
COMPARE SECOND DIGIT OF TWO IDs
DIFFERENT
SAME
S244
JUDGEMENT RESULT = "SAME"
S245
JUDGEMENT RESULT = "DIFFERENT"
RETURN

FIG. 16

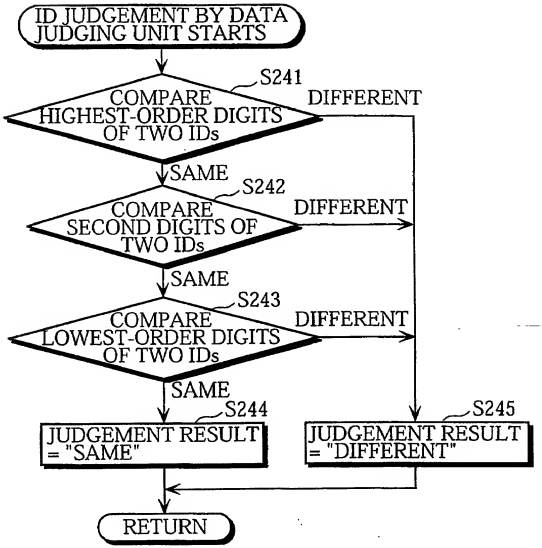

ID JUDGEMENT BY DATA JUDGING UNIT STARTS
S241
COMPARE HIGHEST-ORDER DIGITS OF TWO IDs
DIFFERENT
SAME
S242
COMPARE SECOND DIGITS OF TWO IDs
DIFFERENT
SAME
S243
COMPARE LOWEST-ORDER DIGITS OF TWO IDs
DIFFERENT
SAME
S244
JUDGEMENT RESULT = "SAME"
S245
JUDGEMENT RESULT = "DIFFERENT"
RETURN

FIG. 17

```
1  If purchase state signal = viewing permitted state
2       then link to presentation element 1
3  if purchase state signal = preview state
4       then  no  action
5  if purchase state signal = viewing prohibited state
6       then  hide
```

FIG. 18

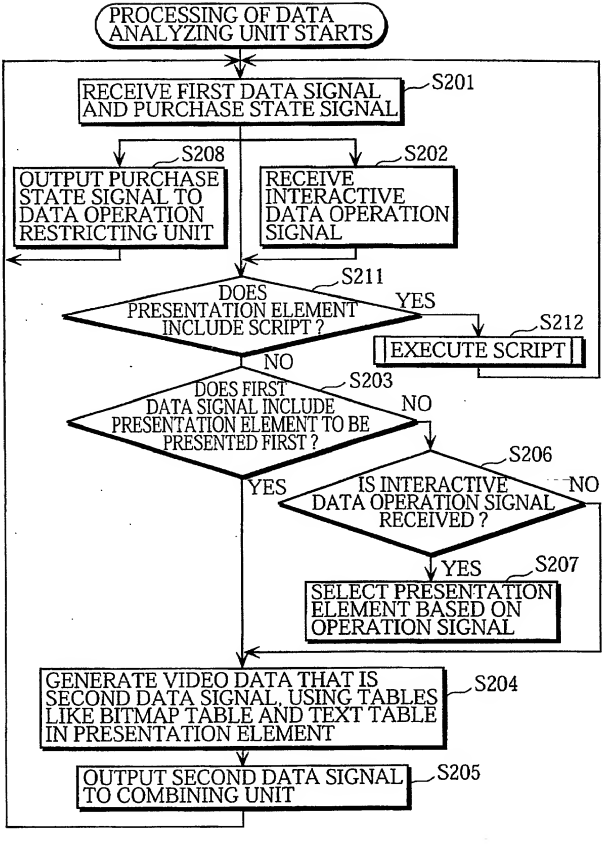

PROCESSING OF DATA ANALYZING UNIT STARTS
RECEIVE FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL
S201
S208
OUTPUT PURCHASE STATE SIGNAL TO DATA OPERATION RESTRICTING UNIT
S202
RECEIVE INTERACTIVE DATA OPERATION SIGNAL
S211
DOES PRESENTATION ELEMENT INCLUDE SCRIPT ?
YES
S212
EXECUTE SCRIPT
NO
S203
DOES FIRST DATA SIGNAL INCLUDE PRESENTATION ELEMENT TO BE PRESENTED FIRST ?
NO
S206
YES
IS INTERACTIVE DATA OPERATION SIGNAL RECEIVED ?
NO
YES
S207
SELECT PRESENTATION ELEMENT BASED ON OPERATION SIGNAL
GENERATE VIDEO DATA THAT IS SECOND DATA SIGNAL, USING TABLES LIKE BITMAP TABLE AND TEXT TABLE IN PRESENTATION ELEMENT
S204
OUTPUT SECOND DATA SIGNAL TO COMBINING UNIT
S205

FIG. 19

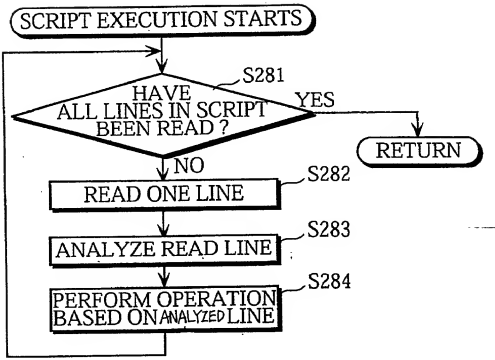

SCRIPT EXECUTION STARTS
S281
HAVE ALL LINES IN SCRIPT BEEN READ ?
YES
RETURN
NO
S282
READ ONE LINE
S283
ANALYZE READ LINE
S284
PERFORM OPERATION BASED ON ANALYZED LINE

FIG. 20

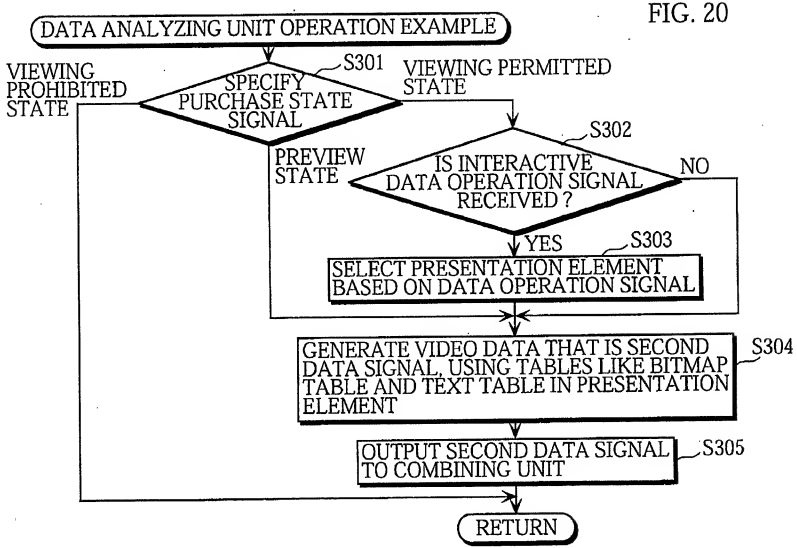

DATA ANALYZING UNIT OPERATION EXAMPLE
S301
SPECIFY PURCHASE STATE SIGNAL
VIEWING PROHIBITED STATE
VIEWING PERMITTED STATE
PREVIEW STATE
S302
IS INTERACTIVE DATA OPERATION SIGNAL RECEIVED ?
NO
YES
S303
SELECT PRESENTATION ELEMENT BASED ON DATA OPERATION SIGNAL
GENERATE VIDEO DATA THAT IS SECOND DATA SIGNAL, USING TABLES LIKE BITMAP TABLE AND TEXT TABLE IN PRESENTATION ELEMENT
S304
OUTPUT SECOND DATA SIGNAL TO COMBINING UNIT
S305
RETURN

FIG. 21

INSTRUCTION REGISTRATION
If purchase state signal = viewing permitted state then perform link If purchase state signal = preview state or viewing prohibited state then ignore link and generate message indicating that no operations are performed unless user purchases program and present generated message to user

FIG. 22

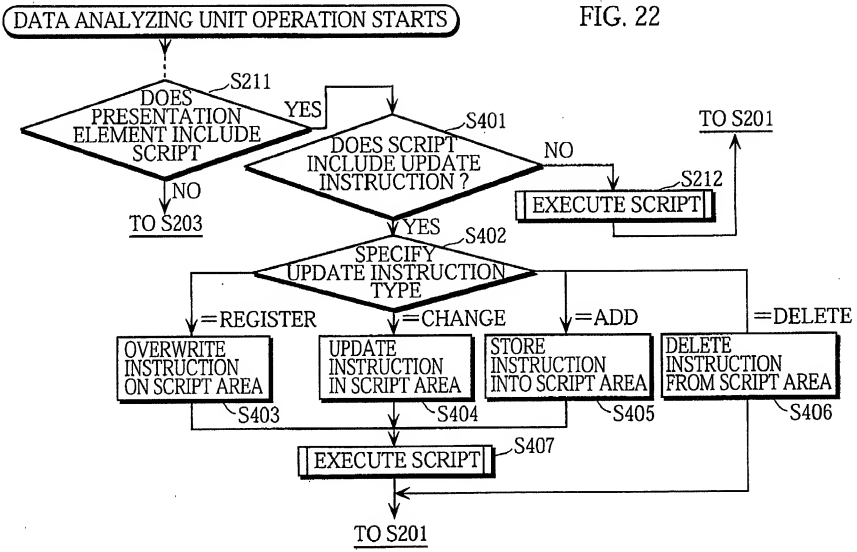

DATA ANALYZING UNIT OPERATION STARTS
S211
DOES PRESENTATION ELEMENT INCLUDE SCRIPT
YES
NO
TO S203
S401
DOES SCRIPT INCLUDE UPDATE INSTRUCTION ?
NO
S212
EXECUTE SCRIPT
TO S201
YES
S402
SPECIFY UPDATE INSTRUCTION TYPE
=REGISTER
=CHANGE
=ADD
=DELETE
OVERWRITE INSTRUCTION ON SCRIPT AREA
S403
UPDATE INSTRUCTION IN SCRIPT AREA
S404
STORE INSTRUCTION INTO SCRIPT AREA
S405
DELETE INSTRUCTION FROM SCRIPT AREA
S406
EXECUTE SCRIPT
S407
TO S201

FIG. 23

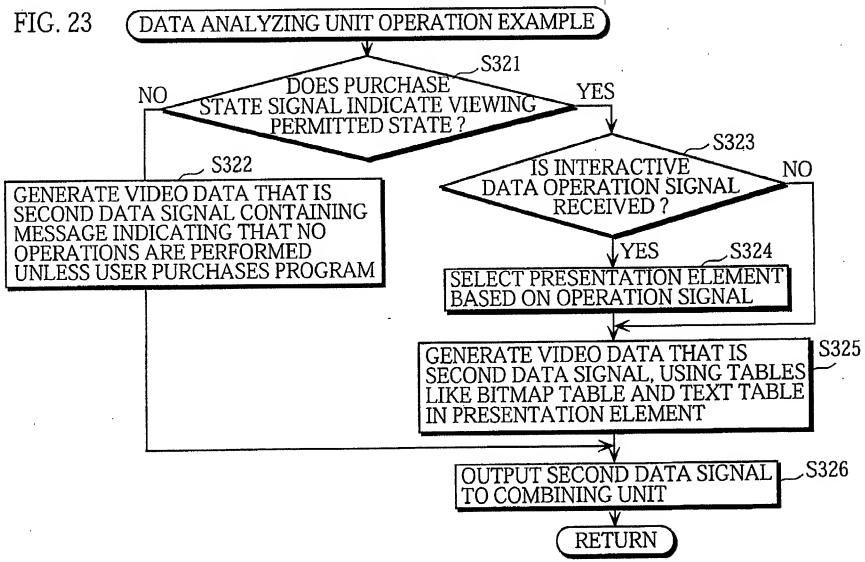

DATA ANALYZING UNIT OPERATION EXAMPLE
S321
DOES PURCHASE STATE SIGNAL INDICATE VIEWING PERMITTED STATE ?
NO
YES
S322
GENERATE VIDEO DATA THAT IS SECOND DATA SIGNAL CONTAINING MESSAGE INDICATING THAT NO OPERATIONS ARE PERFORMED UNLESS USER PURCHASES PROGRAM
S323
IS INTERACTIVE DATA OPERATION SIGNAL RECEIVED ?
NO
YES
S324
SELECT PRESENTATION ELEMENT BASED ON OPERATION SIGNAL
GENERATE VIDEO DATA THAT IS SECOND DATA SIGNAL, USING TABLES LIKE BITMAP TABLE AND TEXT TABLE IN PRESENTATION ELEMENT
S325
OUTPUT SECOND DATA SIGNAL TO COMBINING UNIT
S326
RETURN

FIG. 24

PRESENTATION ELEMENT

VIEWING ENABLED SIGNAL	VIEWING PERMITTED STATE

BITMAP TABLE

INDEX	BITMAP DATA
BITMAP INDEX	BITMAP DATA ONLY PRESENTED IN VIEWING PERMITTED STATE

TEXT TABLE

INDEX	TEXT DATA
TEXT INDEX	TEXT DATA ONLY PRESENTED IN VIEWING PERMITTED STATE

SCRIPT TABLE

INDEX	SCRIPT
SCRIPT INDEX	SCRIPT USED IN VIEWING PERMITTED STATE

HYPERLINK TABLE

INDEX	LINK DESTINATION
LINK INDEX	LINK DESTINATION IN VIEWING PERMITTED STATE

FIG. 25

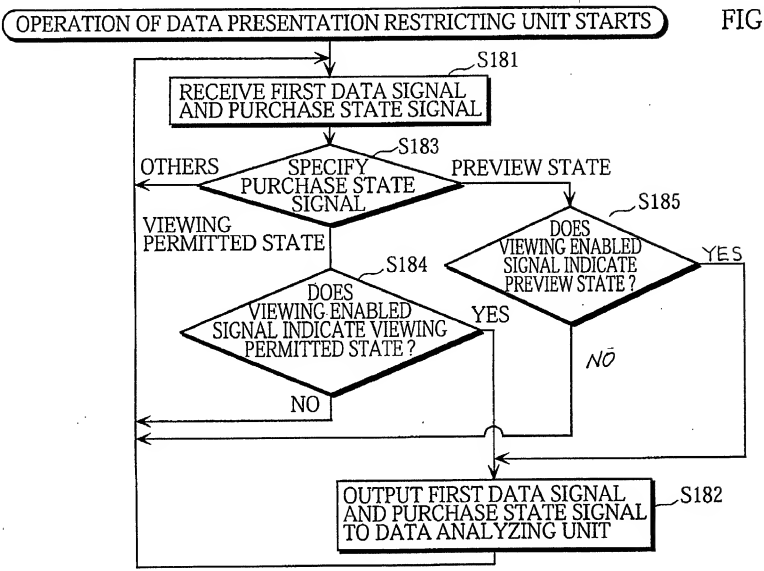

OPERATION OF DATA PRESENTATION RESTRICTING UNIT STARTS
S181
RECEIVE FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL
S183
SPECIFY PURCHASE STATE SIGNAL
OTHERS
PREVIEW STATE
VIEWING PERMITTED STATE
S185
DOES VIEWING ENABLED SIGNAL INDICATE PREVIEW STATE ?
YES
NO
S184
DOES VIEWING ENABLED SIGNAL INDICATE VIEWING PERMITTED STATE ?
YES
NO
OUTPUT FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL TO DATA ANALYZING UNIT
S182

FIG. 26

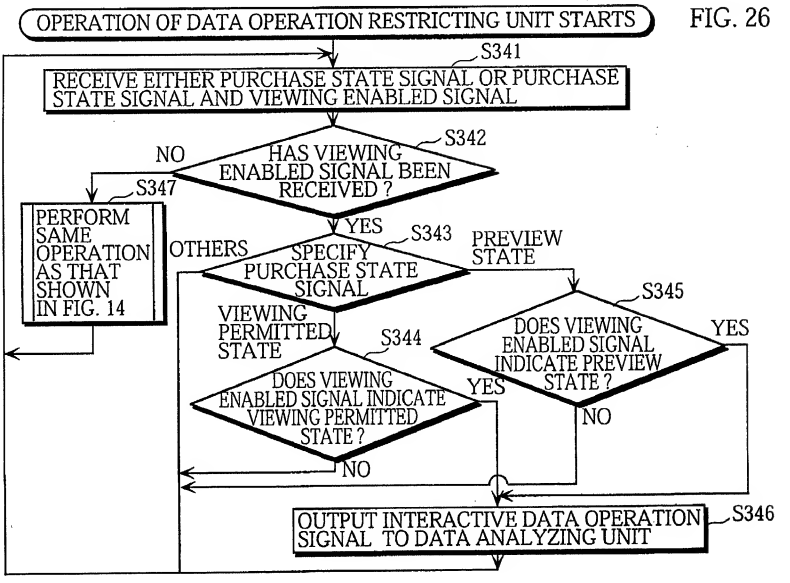

OPERATION OF DATA OPERATION RESTRICTING UNIT STARTS
S341
RECEIVE EITHER PURCHASE STATE SIGNAL OR PURCHASE STATE SIGNAL AND VIEWING ENABLED SIGNAL
S342
HAS VIEWING ENABLED SIGNAL BEEN RECEIVED ?
NO
S347
PERFORM SAME OPERATION AS THAT SHOWN IN FIG. 14
YES
S343
SPECIFY PURCHASE STATE SIGNAL
OTHERS
PREVIEW STATE
VIEWING PERMITTED STATE
S344
DOES VIEWING ENABLED SIGNAL INDICATE VIEWING PERMITTED STATE ?
YES
NO
S345
DOES VIEWING ENABLED SIGNAL INDICATE PREVIEW STATE ?
YES
NO
OUTPUT INTERACTIVE DATA OPERATION SIGNAL TO DATA ANALYZING UNIT
S346

FIG. 27

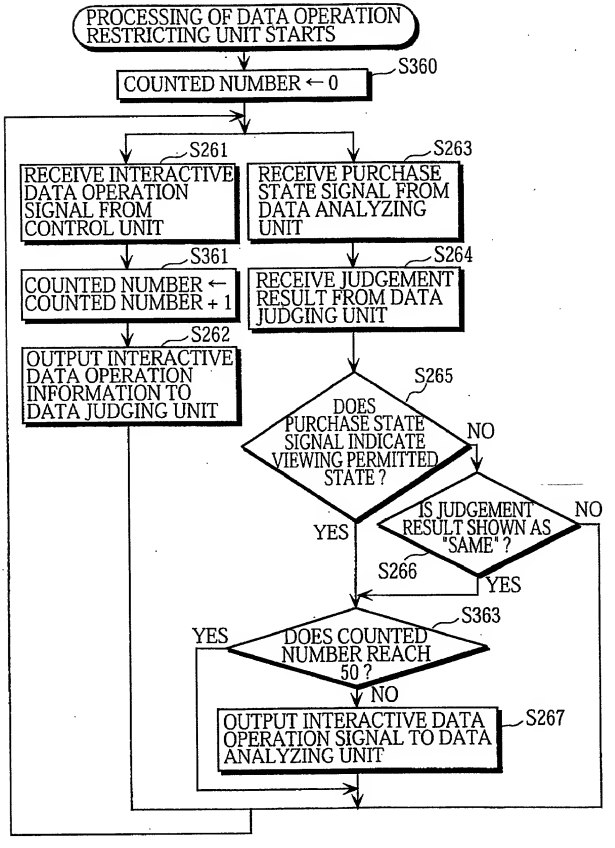

PROCESSING OF DATA OPERATION RESTRICTING UNIT STARTS
COUNTED NUMBER ← 0
S360
S261
RECEIVE INTERACTIVE DATA OPERATION SIGNAL FROM CONTROL UNIT
S263
RECEIVE PURCHASE STATE SIGNAL FROM DATA ANALYZING UNIT
S361
COUNTED NUMBER ← COUNTED NUMBER + 1
S264
RECEIVE JUDGEMENT RESULT FROM DATA JUDGING UNIT
S262
OUTPUT INTERACTIVE DATA OPERATION INFORMATION TO DATA JUDGING UNIT
S265
DOES PURCHASE STATE SIGNAL INDICATE VIEWING PERMITTED STATE ?
NO
YES
IS JUDGEMENT RESULT SHOWN AS "SAME" ?
NO
S266
YES
S363
YES
DOES COUNTED NUMBER REACH 50 ?
NO
OUTPUT INTERACTIVE DATA OPERATION SIGNAL TO DATA ANALYZING UNIT
S267

FIG. 28

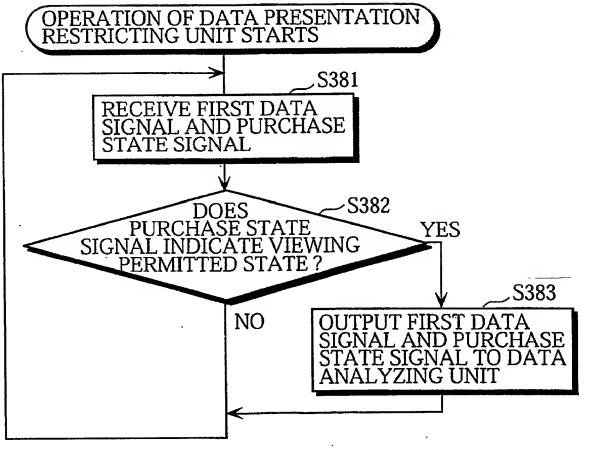
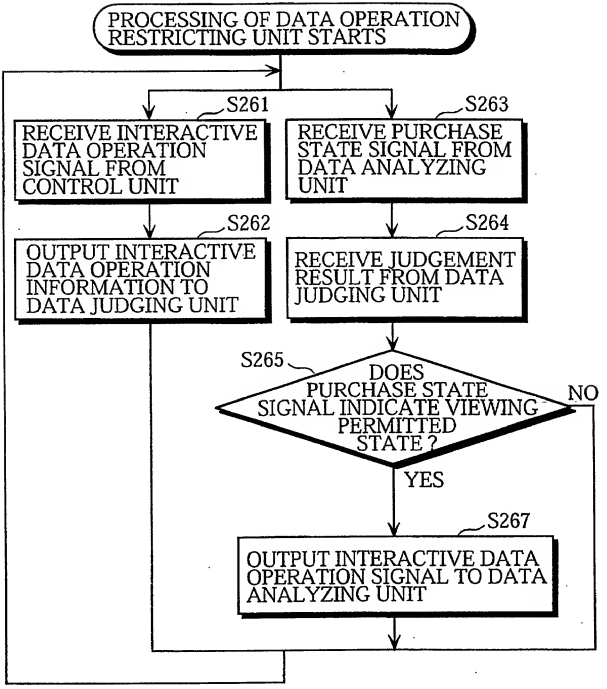

OPERATION OF DATA PRESENTATION RESTRICTING UNIT STARTS
S381
RECEIVE FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL
S382
DOES PURCHASE STATE SIGNAL INDICATE VIEWING PERMITTED STATE ?
YES
NO
S383
OUTPUT FIRST DATA SIGNAL AND PURCHASE STATE SIGNAL TO DATA ANALYZING UNIT

FIG. 29


PROCESSING OF DATA OPERATION RESTRICTING UNIT STARTS
S261
RECEIVE INTERACTIVE DATA OPERATION SIGNAL FROM CONTROL UNIT
S263
RECEIVE PURCHASE STATE SIGNAL FROM DATA ANALYZING UNIT
S262
OUTPUT INTERACTIVE DATA OPERATION INFORMATION TO DATA JUDGING UNIT
S264
RECEIVE JUDGEMENT RESULT FROM DATA JUDGING UNIT
S265
DOES PURCHASE STATE SIGNAL INDICATE VIEWING PERMITTED STATE ?
NO
YES
S267
OUTPUT INTERACTIVE DATA OPERATION SIGNAL TO DATA ANALYZING UNIT